

Application No. 09/997,436  
Attorney Docket No 2001B110  
Response to Office Action of December 23, 2004

### **AMENDMENTS TO THE CLAIMS**

This listing of the claims will replace all prior versions and listings of claims in the application:

#### **Listing of Claims:**

1. A method of removing water and/or oxygenated hydrocarbons from an olefin stream, comprising:  
contacting an oxygenate with an olefin forming catalyst to form an olefin stream, wherein the olefin stream comprises olefin and oxygenated hydrocarbon;  
cooling the olefin stream to form a condensed water containing stream and an olefin vapor stream;  
contacting the olefin vapor stream with caustic wash to remove carbon dioxide; and  
contacting the caustic washed olefin stream with an absorbent in an absorption system to absorb the water and/or oxygenated hydrocarbon from the olefin stream, wherein the absorbent is selected from the group consisting of a polyol, amine, amide, nitrile, heterocyclic nitrogen containing compound, and mixtures thereof.
2. The method of claim 1, further comprising removing an olefin stream from the absorption system.
3. The method of claim 2, wherein the olefin stream removed from the absorption system contains at least 50 wt % less oxygenated hydrocarbon than the olefin stream formed by contacting the oxygenate with the catalyst.
4. The method of claim 1, wherein the absorbent is selected from the group consisting of ethylene glycol, diethylene glycol, triethylene glycol, ethanolamine, diethanolamine, triethylamine, hindered cyclic amines, acetonitrile, n-methylpyrrolidone, dimethyl formamide, and combinations thereof.

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5. The method of claim 1, wherein the absorption system is a countercurrent liquid absorption column.

6. The method of claim 1, further comprising compressing the olefin stream prior to contacting with the absorbent.

7. The method of claim 2, further comprising contacting the olefin stream recovered from the absorption system with an adsorbent to form an olefin product stream.

8. The method of claim 7, further comprising polymerizing olefin in the olefin product stream.

9. The method of claim 7, wherein the olefin product stream contains not greater than 1 wppm water.

10. A method of removing water and/or oxygenated hydrocarbons from an olefin stream, comprising:

providing an olefin stream containing at least 50 wt % ethylene and propylene, not greater than 20 wt % water, and not greater than 15 wt % oxygenated hydrocarbon;

cooling the olefin stream to form a condensed water containing stream and an olefin vapor stream;

contacting the olefin vapor stream with caustic wash to remove carbon dioxide; and

contacting the caustic washed olefin stream with an absorbent to absorb water and/or oxygenated hydrocarbon from the olefin stream, wherein the absorbent is selected from the group consisting of a polyol, amine, amide, nitrile, heterocyclic nitrogen containing compound, and mixtures thereof.

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11. The method of claim 10, wherein the olefin stream contains at least 55 wt % ethylene and propylene.
12. The method of claim 10, wherein the olefin stream contains at least 60 wt % ethylene and propylene.
13. The method of claim 10, wherein the olefin stream contains not greater than 15 wt % water.
14. The method of claim 10, wherein the olefin stream contains not greater than 10 wt % water.
15. The method of claim 10, wherein the olefin stream contains not greater than 12 wt % oxygenated hydrocarbon.
16. The method of claim 10, wherein the olefin stream contains not greater than 10 wt % oxygenated hydrocarbon.
17. The method of claim 10, wherein the absorbent is selected from the group consisting of ethylene glycol, diethylene glycol, triethylene glycol, ethanolamine, diethanolamine, triethylamine, hindered cyclic amines, acetonitrile, n-methylpyrrolidone, dimethyl formamide, and combinations thereof.
18. The method of claim 10, further comprising recovering olefin from the absorbed vapor stream and polymerizing the olefin.
19. A method of removing water and/or oxygenated hydrocarbons from an olefin stream, comprising:

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providing an olefin vapor stream, wherein the olefin vapor stream comprises olefin, water and oxygenated hydrocarbon;

cooling the olefin stream to form a condensed water containing stream and an olefin vapor stream;

contacting the olefin vapor stream with caustic wash to remove carbon dioxide; and

contacting the caustic washed olefin vapor stream with an absorbent in an absorption system to absorb the oxygenated hydrocarbon and/or water from the olefin vapor stream, wherein the absorbent is selected from the group consisting of a polyol, amine, amide, nitrile, heterocyclic nitrogen containing compound, and mixtures thereof.

20. The method of claim 19, further comprising removing an olefin stream from the absorption system.

21. The method of claim 20, wherein the olefin stream removed from the absorption system contains not greater than 1000 wppm water.

22. The method of claim 20, wherein the olefin stream removed from the absorption system contains at least 50 wt % less oxygenated hydrocarbon and water than the provided olefin vapor stream.

23. The method of claim 19, wherein the absorbent is selected from the group consisting of ethylene glycol, diethylene glycol, triethylene glycol, ethanolamine, diethanolamine, triethylamine, hindered cyclic amines, acetonitrile, n-methylpyrrolidone, dimethyl formamide, and combinations thereof.

24. The method of claim 19, wherein the absorption system is a countercurrent liquid absorption column.

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25. The method of claim 19, further comprising compressing the provided olefin vapor stream prior to contacting with the absorbent.

26. The method of claim 20, further comprising contacting the olefin stream removed from the absorption system with an adsorbent to form an olefin product stream.

27. The method of claim 26, further comprising polymerizing olefin in the olefin product stream.

28. The method of claim 26, wherein the olefin product stream contains not greater than 1 wppm water.

29. A method of removing water from an olefin stream, comprising:  
contacting an oxygenate with an olefin forming catalyst to form an olefin stream, wherein the olefin stream comprises olefin and water;  
cooling the olefin stream to form a condensed water containing stream and an olefin vapor stream;  
contacting the olefin vapor stream with caustic wash to remove carbon dioxide; and  
contacting the caustic washed olefin stream with an absorbent in an absorption system to absorb the water from the olefin stream, wherein the absorbent is selected from the group consisting of a polyol, amine, amide, nitrile, heterocyclic nitrogen containing compound, and mixtures thereof.

30. The method of claim 29, further comprising removing an olefin stream from the absorption system.

31. The method of claim 30, wherein the olefin stream removed from the absorption system contains at least 50 wt % less water than the olefin stream formed by contacting the oxygenate with the catalyst.

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32. The method of claim 29, wherein the absorbent is selected from the group consisting of ethylene glycol, diethylene glycol, triethylene glycol, ethanolamine, diethanolamine, triethylamine, hindered cyclic amines, acetonitrile, n-methylpyrrolidone, dimethyl formamide, and combinations thereof.